THE PEDICLE SHEATH OF YOUNG PRODUCTACEAN BRACHIOPODS

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ABSTRACT. Recent studies of young silicified productaceans from the Viséan limestones of Co. Fermanagh, Northern Ireland, reveal, for the first time, that their pedicle valves were commonly furnished with a structure believed to have been a pedicle sheaht.

ONE of the principal features of chonetoid and strophomenoid brachiopods is the variable development of an open, supra-apical sheath extending posteriorly from the beak of juvenile pedicle valves. This structure is believed to have accommodated the pedicle (Williams 1956, p. 258) and, although the morphology of adult shells indicates that the organ rarely persisted during late stages of growth, it has played an important part in the classification and morphogeny of the Strophomenida. Thus the productoids are generally assumed never to have possessed even a pedicle sheath, and this alleged absence has been taken as important evidence for the belief that the spinose productoids evolved independently of the chonetoids, the other spinose group of the Strophomenida (Muir-Wood 1962, p. 6). The purpose of this note is to report the discovery of pedicle sheaths, comparable with those of the chonetoids and strophomenoids, in certain productoid genera.

The material studied consists of very finely silicified brachiopod assemblages that have been etched out of Viséan argillaceous limestones from Co. Fermanagh. Good growth series of a number of stocks have been recovered in this manner, including the remains of seven productacean genera, viz. *Productina*, *Overtonia*, *Avonia*, *Krotovia*, *Plicatifera*, *Eomarginifera*, and *Echinoconchus*. Five of these clearly show a structure on the ventral beak which is believed to be a pedicle sheath. *Overtonia* and *Avonia* bear signs of a similar feature; while *Echinoconchus* is too imperfectly represented to be of use.

The pedicle sheath is usually seen on young shells, or pedicle valves, about 1·5 mm. long, which are commonly preserved with the protegulal node and all the juvenile spines intact, but it has also been observed on valves more than 8 mm. long, like those of *Productina margaritacea* (Phillips) (Pl. 109, figs. 2–4). In all genera the pedicle sheath appears as a short spine-like protuberance, about 0·2 mm. long and between 0·05 mm. and 0·1 mm. in diameter, arising from the mid-posterior region of the protegulal node. When the protegulal node is bipartite, as in *P. margaritacea*, the pedicle sheath extended posteriorly from the median groove, while in the more oval protegulal nodes of certain species of *Avonia* and *Eomarginifera* it occupied the postero-median tip (Pl. 109, figs. 5, 6). The location of this sheath is so close to that of the chonetoid and strophomenoid pedicle sheath as to preclude the possibility that it was merely a spine.

Ventro-anteriorly, across the brephic pedicle valve, there is a groove, commonly 0·2 mm. wide, but variable in depth, which is encircled by one to three pairs of clasping spines. This groove terminates posteriorly close to the pedicle sheath which rarely can be seen to have curved towards it as if the pedicle had been attached to a slender object

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lying along the groove. Distortion in the growth of the shell along the edges of the groove suggests that this might have been so, although the attitude of the clasping spines is considered to have been genetically controlled.

It is suggested, therefore, that at least some productacean spats attached themselves by means of a pedicle contained in an external sheath, which remained functional probably only throughout the brephic stage of development. Whether attachment in this manner was common to all young productaceans remains to be seen, although it may be significant that no traces of a pedicle sheath have been seen in the young shells of two strophalosians, *Strophalosia* and *Heteralosia*, which also occur in the Fermanagh faunas.

REFERENCES

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EXPLANATION OF PLATE 109

The specimens in figs. 1–6 were etched from the Viséan subreefal argillaceous limestones of the Sillees River, Bunnahone, 2 miles north-west of Derrygonnelly, Co. Fermanagh, Northern Ireland. Figs. 7 and 8 are from the Mid-Silurian Waldron Shales.

Fig. 1. Posterior view of a young chonetid with pedicle sheath and grooved brephic valve (×15).

Fig. 2. Posterior view of the pedicle valve of *Productina margaritacea* (Phillips) showing the pedicle sheath and grooved brephic valve (×10).

Fig. 3. Antero-dorsal view of the same valve (×12).

Fig. 4. Dorso-posterior view of the same valve showing the position of the pedicle sheath in relation to the protegulal node and grooved brephic valve (×10).

Fig. 5. Antero-dorsal view of a young *Eomarginifera* sp. (×20).

Fig. 6. Ventral view of a juvenile *Eomarginifera* sp. showing the pedicle sheath, slightly grooved brephic portion of the valve and neanic clasping spines (×17).

Fig. 7. Dorsal view of a juvenile *Fardinia* shell showing the pedicle sheath and dorso-posterior margin of the pedicle valve (×20).

Fig. 8. Ventral view of the same shell as above (×20).